



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,461	04/03/2006	Gerhard Breuer	BREUER, G. ET AL-3 (PCT)	3045
25889	7590	07/21/2008	EXAMINER	
COLLARD & ROE, P.C. 1077 NORTHERN BOULEVARD ROSLYN, NY 11576			MYERS, JESSICA L	
ART UNIT	PAPER NUMBER			
	3746			
MAIL DATE	DELIVERY MODE			
07/21/2008	PAPER			

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/560,461	<b>Applicant(s)</b> BREUER ET AL.
	<b>Examiner</b> JESSICA L. MYERS	<b>Art Unit</b> 3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 4/3/06.  
 2a) This action is FINAL.      2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 9-15 is/are pending in the application.  
 4a) Of the above claim(s) 1-8 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 9-15 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 14 December 2005 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-166/08)  
 Paper No(s)/Mail Date 12/14/2005.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_

5) Notice of Informal Patent Application

6) Other: \_\_\_\_\_

#### **DETAILED ACTION**

##### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

##### In Reference to Claim 11

2. Claim 11 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 11 states that the hard metal "contains G20, GC37, or GC20" and it is unclear whether these codes represent a type of material or how this type of material is contained in the hard metal.

##### In Reference to Claim 12

3. Claim 12 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 12 states that the cast carbide material "contains GGH or SoGGH" and it is unclear whether these codes represent a type of material or how this type of material is contained in the hard metal.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

In Reference to Claim 12

5. Regarding claim 12, the phrase "in particular" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.

In Reference to Claim 12

6. Regarding claim 12, the phrase "and/or" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,979,297 to Ricco (Ricco).

In Reference to Claim 9

Ricco teaches a radial piston pump (pump (15) see figure 1) for high-pressure fuel generation in fuel injection systems of internal combustion engines, in particular in a common rail injection system, having a drive shaft (drive shaft (28)) which is mounted in

a pump casing and has an eccentric shaft section (eccentric portion (35)) on which a running roller (annular cam (39)) is mounted, and having preferably a plurality of pistons (pistons (42)), which are arranged in a respective cylinder (cylindrical holes (41)) radially with respect to the drive shaft (see figure 2) and each have a piston footplate (pads (43)), which makes contact with the circumferential surface of the running roller, at their ends facing the running roller, wherein at least that surface of the piston footplate which is in contact with the circumferential surface of the running roller consists of hard metal (each pad has a disk shaped shoe (66), housed inside a circular cavity (67), which contacts the cam and is made from steel or bronze, see column 3 lines 12-28), a cast carbide material, or cermet.

In Reference to Claim 10

Ricco teaches the radial piston pump as claimed in claim 9 (see the rejection of claim 9 above), wherein the piston footplate, on its surface facing the running roller, bears at least one insert made from hard metal (each pad has a disk shaped shoe (66), housed inside a circular cavity (67), which contacts the cam and is made from steel or bronze, see column 3 lines 12-28), from a cast carbide material or from cermet.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 11, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ricco in view of U.S. Patent 6,237,441 to Nishioka et al. (Nishioka et al.).

In Reference to Claim 11

Ricco teaches the radial piston pump as claimed in claim 9 (see the rejection of claim 9 above), but does not teach that the surface of the piston footplate has a surface roughness  $R_z$  of between  $0.3 \mu\text{m}$  and  $1.0 \mu\text{m}$ .

Nishioka et al. teach a cam driven fuel feed pump where pistons that come into contact with the cam have shims inserted in between the pistons and the cams in order to reduce friction and lessen wear (see figure 1 and figure 13). Nishioka et al. disclose that the shim surface roughness can lie between  $.07 \mu\text{m}$  and  $.4 \mu\text{m}$  (see column 4 lines 26-37). It would have been obvious to one having ordinary skill in the art at the time the invention was made that the surface roughness of piston footplate of Ricco could be varied to lessen the amount of wear on the footplate as taught by Nishioka et al. Additionally, Nishioka et al. also teach the general range of surface roughness that applicant claims and note that smoother surfaces require more labor and come at a higher cost. One of ordinary skill in the art at the time of invention would realize the tradeoffs between smoothness and cost and would be capable of optimizing the smoothness of the piston footplate, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

In Reference to Claim 12

Ricco teaches the radial piston pump as claimed in claim 9 (see the rejection of claim 9 above), but does not teach that the surface of the piston footplate has a surface roughness  $R_z$  of between  $0.5 \mu\text{m}$  and  $2.0 \mu\text{m}$ , or that the piston footplate contains a chilled cast iron material.

Nishioka et al. teach a cam driven fuel feed pump where pistons that come into contact with the cam have shims inserted in between the pistons and the cams in order to reduce friction and lessen wear (see figure 1 and figure 13). Nishioka et al. disclose that the shim surface roughness can lie between  $.07 \mu\text{m}$  and  $.4 \mu\text{m}$  (see column 4 lines 26-37). . It would have been obvious to one having ordinary skill in the art at the time the invention was made that the surface roughness of piston footplate of Ricco could be varied to lessen the amount of wear on the footplate as taught by Nishioka et al. Additionally, Nishioka et al. also teach the general range of surface roughness that applicant claims and note that smoother surfaces require more labor and come at a higher cost. One of ordinary skill in the art at the time of invention would realize the tradeoffs between smoothness and cost and would be capable of optimizing the smoothness of the piston footplate, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. Furthermore, Nishioka et al. also teach that the sliding surface of the piston can be made from a chilled iron alloy (see column 1 lines 41-3). It would have been obvious to one of ordinary skill in the art at the time of invention to form the piston of Ricco from a chilled iron alloy as taught by Nishioka et al. since iron alloys are a common, durable material.

In Reference to Claim 15

Ricco teaches Claim 15 (New). The radial piston pump as claimed in claim 9 (see the rejection of claim 9 above), but does not teach that the surface of the piston footplate has a surface roughness  $R_z$  of between  $0.15 \mu\text{m}$  and  $2.0 \mu\text{m}$ .

Nishioka et al. teach a cam driven fuel feed pump where pistons that come into contact with the cam have shims inserted in between the pistons and the cams in order to reduce friction and lessen wear (see figure 1 and figure 13). Nishioka et al. disclose that the shim surface roughness can lie between  $.07 \mu\text{m}$  and  $.4 \mu\text{m}$  (see column 4 lines 26-37). It would have been obvious to one having ordinary skill in the art at the time the invention was made that the surface roughness of piston footplate of Ricco could be varied to lessen the amount of wear on the footplate as taught by Nishioka et al. Additionally, Nishioka et al. also teach the general range of surface roughness that applicant claims and note that smoother surfaces require more labor and come at a higher cost. One of ordinary skill in the art at the time of invention would realize the tradeoffs between smoothness and cost and would be capable of optimizing the smoothness of the piston footplate, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

11. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ricco in view of German Patent DE 10223730 to Inayoshi (Inayoshi) (a machine translation has been included).

Ricco teaches the radial piston pump as claimed in claim 9 (see the rejection of claim 9 above), but does not teach that the piston footplate has at least two grooves on its surface which cross one another.

Inayoshi teaches a similar fuel injection pump with pistons (70) that have piston heads (71) that contact a portion of a cam (see figure 2). These piston heads (71) are grooved with multiple recesses (511 and 521) formed on the sliding surface (71a) of the piston head (see figure 3, as well as page 3 of the translation document, paragraphs 6 and 7). It would have been obvious to one of ordinary skill in the art at the time of invention to include the grooves as taught by Inayoshi in the face of the piston of Ricco in order to allow an oil film to fill the grooves and lubricate the system so that wear can be reduced.

12. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ricco as modified by Inayoshi and in further view of U.S. Patent 6,350,107 to Hamutcu (Hamutcu).

Ricco as modified by Inayoshi teaches the radial piston pump as claimed in claim 13 (see the rejection of claim 13 above), but does not teach that one such groove is in each case arranged in the center of a depression.

Hamutcu teaches another radial piston fuel pump where the bases of reciprocating pistons (14) come into a sliding contact with a rotating cam (8). Hamutcu teaches that the center of the bases of these pistons undergo great stresses during the operation of the pump, and that in order to relieve the pressure on the piston feet, a

conical recess (X) is formed at the center of the base of the piston foot (see column 2 lines 1-41). It would have been obvious to one of ordinary skill in the art at the time of invention to form the piston feet of Ricco with a conical depression as taught by Hamutcu in order to relieve stresses on the piston feet. When the apparatus of Ricco as modified by Inayoshi is modified by Hamutcu, at least one of the grooves as taught by Inayoshi will run through the depression as taught by Hamutcu, forming a groove run-out in the surface of the piston foot.

***Conclusion***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSICA L. MYERS whose telephone number is (571)270-5059. The examiner can normally be reached on Monday through Friday, 8:30am to 5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

14. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/  
Supervisory Patent Examiner, Art  
Unit 3746

/JLM